

## WHAT IS CLAIMED IS:

1           1.     A method for providing printer recognition and management of a print  
2 job entity, comprising:

3                 establishing a repository of attributes and status information associated with  
4 each print job that passes through a printer system; and

5                 providing an interface to a plurality of components to allow access to the  
6 attributes and status information in the repository by the plurality of components.

1           2.     The method of claim 1 wherein the interface comprises at least one of  
2 a Web Page channel, a multiplexer to manage the routing of jobs to the print engine  
3 and a spooler, a job control function interface, a pipeline interface, an operations  
4 panel interface and a pull print interface.

1           3.     The method of claim 1 further comprising providing by the interface an  
2 ability for components to process a job according to requirements of the component  
3 and reporting job attributes and processing status of the job for common access by  
4 other components.

1           4.     The method of claim 1 further comprising providing by the interface  
2 access to maintained job variable to the components.

1           5.     The method of claim 1 further comprising providing by the interface to  
2 a component access to common variables, the components presenting job attributes  
3 or status to the interface.

1           6.     The method of claim 5 wherein the attributes are presented according  
2 to requirements dictated by the interface

1           7.     The method of claim 1 wherein the interface provides the ability for  
2 components to create job entries, obtain and set job attributes, manipulate the state  
3 and status of jobs in the system, and obtain job ordering information pertinent to the  
4 calling component.

1           8.     The method of claim 1 wherein the repository provides a global view of  
2 jobs within the printer, the global view includes an actively printing job, jobs in the  
3 process of being spooled, jobs on the spool queue, and jobs on the pull print queue.

1           9.     The method of claim 1 wherein the interface accommodates either  
2 implementation of port connection managers and pass job information from a port  
3 connection manager to the repository.

1           10.    The method of claim 1 wherein the interface cancels jobs.

1           11.    The method of claim 10 wherein a cancelled job comprises a current  
2 job.

1           12.    The method of claim 10 wherein a cancelled job comprises a job  
2 having a selected attribute.

1           13.    The method of claim 1 further comprising providing logical views to  
2    obtain a next job to be processed by a component and to obtain a list of all jobs in  
3    the order that they are processed.

1           14.    The method of claim 1 further comprises establishing a job monitor for  
2    obtaining a Job ID, performing a query for attributes of a job, updating job attributes,  
3    canceling jobs, providing logical views of a job, handling printer events, getting  
4    attributes of the printer and setting printer attributes.

1           15.    The method of claim 14 wherein the attributes are updated through the  
2    job monitor.

1           16.    The method of claim 14 wherein the job monitor provides the ability for  
2    any component to set job attributes.

1           17.    The method of claim 14 wherein the job monitor uses job states to  
2    control the flow of jobs.

1           18.    The method of claim 14 further comprising responding by the job  
2    monitor to a component call, wherein the job monitor determines a next job to  
3    process and wherein the component determines valid states for a call.

1           19.    The method of claim 18 further comprising maintaining a valid state for  
2    a multiplexer.

1           20.    The method of claim 19 wherein the maintaining a valid state for a  
2 multiplexer further comprises:

3           placing an incoming job into an unknown state when a job identification is  
4 requested;

5           placing the incoming job in the Pull Print queue when the job is stop-flowed at  
6 a port connection manager waiting for access to the printer because a print engine  
7 is processing another job; and

8           selecting the incoming job and processing the job according to whether the  
9 job must be spooled, may spool or must print.

1           21.    The method of claim 20 wherein the incoming job is routed to the print  
2 engine or the spooler according to which comes first when the job is a job that may  
3 spool.

1           22.    The method of claim 20 wherein the incoming job is placed in a  
2 pending spooler when the job is a job that must be spooled.

1           23.    The method of claim 20 further comprising indicating a done state for  
2 the multiplexer when the job has been printed.

1           24.    The method of claim 18 further comprising maintaining a valid state for  
2 a spooler.

1           25.    The method of claim 24 wherein the maintaining a valid state for a  
2 spooler further comprises:  
3           receiving a job identification request;  
4           entering a not spooled state when the spooler has not yet processed the job;  
5           entering a spooling, can despool state when the job is being written to the  
6 spool device thereby allowing the job to be selected for despooling at any time;  
7           entering a spooling, despooling state when the job is being written to the  
8 spool device and is also being read from the spool device;  
9           entering a waiting to despool state when the end of the job has been  
10 received;  
11          entering a despooling state when the job is being read from the spool device  
12 and written to the multiplexer; and  
13          entering the done state when the job is finished being processed by the  
14 spooler.

1           26.    The method of claim 25 wherein a job that is printed directly and not  
2 processed by the spooler remains in the not spooled state.

1           27.    The method of claim 18 further comprising maintaining a valid state for  
2 an interpreter.

1           28.    The method of claim 27 wherein the maintaining a valid state for a  
2 interpreter further comprises:

3           entering a waiting for data state when job processing by the interpreter has  
4 started;

5           entering an interpreting state when the job is being processed by the  
6 interpreter; and

7           entering a done state when the job is finished being processed by the  
8 interpreter.

1           29.    The method of claim 18 further comprising maintaining a valid state for  
2 a print engine.

1           30.    The method of claim 29 wherein the maintaining a valid state for a  
2 print engine further comprises:

3           entering a waiting for pages state when job processing by an interpreter has  
4 not yet started;

5           entering a waiting for pages state when the job has started;

6           entering the pages queued state when one or more pages for the job have  
7 been created by the interpreter and written to the page buffer;

8           entering the pages printing state when one or more pages for the job have  
9 been delivered to the output tray; and

10          entering the done state when the last page for the job has been delivered to  
11 the output tray.

1           31.    The method of claim 1 further comprising handling incoming jobs with  
2   a port connection manager, wherein the port connection manager calls to a  
3   multiplexer to process the job.

1           32.    The method of claim 1 further comprising deciding whether to assign a  
2   job to the printer, whether to assign a job to a spooler, whether the job must wait for  
3   available resources or whether the job cannot be processed.

1           33.    The method of claim 1 further comprising requesting from a job  
2   monitor a job identification prior to processing the job by a multiplexer.

1           34.    The method of claim 33 further comprising storing the job identification  
2   in a job table and clearing the job identification from the table when an end of job is  
3   called by a port connection manager.

1           35.    The method of claim 1 further comprising providing a job monitor to  
2   fetch jobs in an order that is dependent upon the calling component.

1           36.    The method of claim 35 further comprising examining by the job  
2   monitor process job states and variables to determine the correct response and to  
3   return an appropriate job identification for a job.

1           37.    The method of claim 1 further comprising providing an event  
2   registration to provide a methodology for a controller to indicate events to a job  
3   monitor, wherein the Job Monitor serves as the system focal point for tracking job  
4   related events as they occur during the course of an entire print process.

1           38.    The method of claim 37 further comprising defining events for the job  
2   monitor.

1           39.    The method of claim 1 further comprising providing a job monitor for  
2   addressing job processing complexity by viewing a job on a higher conceptual plane  
3   rather than managing a collection of attributes and status variables that is unique for  
4   each data channel.

1           40.    The method of claim 1 further comprising providing a job monitor for  
2   providing a common method of accessing the variables associated with a job for the  
3   components.

1           41.    An apparatus for providing printer recognition and management of a  
2   print job entity, comprising:  
3           a repository of attributes and status information associated with each print job  
4   that passes through a printer system; and  
5           an interface to a plurality of components, the interface providing access to the  
6   attributes and status information in the repository by the plurality of components.

1           42.    The apparatus of claim 41 wherein the interface comprises at least  
2   one of a Web Page channel, a multiplexer to manage the routing of jobs to the print  
3   engine and a spooler, a job control function interface, a pipeline interface, an  
4   operations panel interface and a pull print interface.



1           43.    The apparatus of claim 41 wherein the interface provides an ability for  
2 components to process a job according to requirements of the component and  
3 reports job attributes and processing status of the job for common access by other  
4 components.

1           44.    The apparatus of claim 41 wherein the interface provides access to  
2 maintained job variable to the components.

1           45.    The apparatus of claim 41 wherein the interface provides a component  
2 access to common variables, the components presenting job attributes or status to  
3 the interface.

1           46.    The apparatus of claim 45 wherein the attributes are presented  
2 according to requirements dictated by the interface

1           47.    The apparatus of claim 41 wherein the interface provides the ability for  
2 components to create job entries, obtain and set job attributes, manipulate the state  
3 and status of jobs in the system, and obtain job ordering information pertinent to the  
4 calling component.

1           48.    The apparatus of claim 41 wherein the repository provides a global  
2 view of jobs within the printer, the global view includes an actively printing job, jobs  
3 in the process of being spooled, jobs on the spool queue, and jobs on the pull print  
4 queue.

1           49.    The apparatus of claim 41 wherein the interface accommodates either  
2   implementation of port connection managers and pass job information from a port  
3   connection manager to the repository.

1           50.    The apparatus of claim 41 wherein the interface cancels jobs.

1           51.    The apparatus of claim 50 wherein a cancelled job comprises a current  
2   job.

1           52.    The apparatus of claim 50 wherein a cancelled job comprises a job  
2   having a selected attribute.

1           53.    The apparatus of claim 41 wherein the a repository and interface are  
2   provided by a job monitor, the job monitor further providing logical views to obtain a  
3   next job to be processed by a component and to obtain a list of all jobs in the order  
4   that they are processed.

1           54.    The apparatus of claim 41 wherein the job monitor obtains a Job  
2   identification, performs a query for attributes of a job, updates job attributes, cancels  
3   jobs, provides logical views of a job, handles printer events, gets attributes of the  
4   printer and sets printer attributes.

1           55.    The apparatus of claim 54 wherein the attributes are updated through  
2   the job monitor.

1           56.    The apparatus of claim 54 wherein the job monitor provides the ability  
2 for any component to set job attributes.

1           57.    The apparatus of claim 54 wherein the job monitor uses job states to  
2 control the flow of jobs.

1           58.    The apparatus of claim 54 wherein the job monitor responds to a  
2 component call, determines a next job to process, the component determining valid  
3 states for a call.

1           59.    The apparatus of claim 58 further comprising a multiplexer.

1           60.    The apparatus of claim 59 wherein the valid states for a multiplexer  
2 further comprise:

3                an unknown stated for when a job identification is requested; and

4                a pull print queue state for the job when the job is stop-flowed at a port  
5 connection manager waiting for access to the printer because a print engine is  
6 processing another job;

7                wherein the multiplexer receives the job and selects to place the job in a job  
8 must be spooled state, a may spool state or must print state.

1           61.    The apparatus of claim 60 wherein the multiplexer routes the incoming  
2 job to the print engine or the spooler according to which becomes available first  
3 when the job is a job that may spool.

1           62.    The apparatus of claim 60 wherein the multiplexer places an incoming  
2 job in a pending spooler when the job is a job that must be spooled.

1           63.    The apparatus of claim 60 wherein the multiplexer enters a done state  
2 for the multiplexer when the job has been printed.

1           64.    The apparatus of claim 58 further comprising a spooler.

1           65.    The apparatus of claim 64 wherein the spooler receiving a job  
2 identification request, enters a not spooled state when the spooler has not yet  
3 processed the job, enters a spooling, can despool state when the job is being  
4 written to the spool device thereby allowing the job to be selected for despooling at  
5 any time, enters a spooling, despooling state when the job is being written to the  
6 spool device and is also being read from the spool device, enters a waiting to  
7 despool state when the end of the job has been received, enters a despooling state  
8 when the job is being read from the spool device and written to the multiplexer and  
9 enters the done state when the job is finished being processed by the spooler.

1           66.    The apparatus of claim 65 wherein a job that is printed directly and not  
2 processed by the spooler remains in the not spooled state.

1           67.    The apparatus of claim 58 further comprising an interpreter.

1           68.    The apparatus of claim 67 wherein the interpreter enters a waiting for  
2   data stated when job processing by the interpreter has started, enters an  
3   interpreting state when the job is being processed by the interpreter and enters a  
4   done state when the job is finished being processed by the interpreter.

1           69.    The apparatus of claim 58 further comprising a print engine.

1           70.    The apparatus of claim 69 wherein the print engine enters a waiting for  
2   pages state when job processing by an interpreter has not yet started, enters a  
3   waiting for pages state when the job has started, enters the pages queued state  
4   when one or more pages for the job have been created by the interpreter and  
5   written to the page buffer, enters the pages printing state when one or more pages  
6   for the job have been delivered to the output tray and enters the done state when  
7   the last page for the job has been delivered to the output tray.

1           71.    The apparatus of claim 41 wherein the a repository and interface are  
2   provided by a job monitor, the job monitor further handling incoming jobs with a port  
3   connection manager, wherein the port connection manager calls to a multiplexer to  
4   process the job.

1           72.    The apparatus of claim 41 wherein the a repository and interface are  
2   provided by a job monitor, the job monitor further deciding whether to assign a job to  
3   the printer, whether to assign a job to a spooler, whether the job must wait for  
4   available resources or whether the job cannot be processed.

1           73.    The apparatus of claim 41 wherein the a repository and interface are  
2   provided by a job monitor, the job monitor receiving a request for a job identification  
3   prior to processing the job by a multiplexer.

1           74.    The apparatus of claim 73 wherein the job identification is stored in a  
2   job table, the job monitor clearing the job identification from the table when an end  
3   of job is called by a port connection manager.

1           75.    The apparatus of claim 41 further comprising a job monitor to fetch  
2   jobs in an order that is dependent upon the calling component.

1           76.    The apparatus of claim 75 further comprising a job monitor for  
2   examining process job states and variables to determine the correct response and  
3   to return an appropriate job identification for a job.

1           77.    The apparatus of claim 41 further comprising a job monitor for serving  
2   as a focal point for tracking job related events as they occur during the course of an  
3   entire print process.

1           78.    The apparatus of claim 77 further comprising events definitions for the  
2   job monitor.

1           79.    The apparatus of claim 41 further comprising a job monitor for  
2   addressing job processing complexity by viewing a job on a higher conceptual plane  
3   rather than managing a collection of attributes and status variables that is unique for  
4   each data channel.

1           80.    The apparatus of claim 41 further comprising a job monitor for  
2    providing a common method of accessing the variables associated with a job for the  
3    components.

1           81.    An article of manufacture comprising a program storage medium  
2    readable by a computer, the medium tangibly embodying one or more programs of  
3    instructions executable by the computer to perform a method for providing printer  
4    recognition and management of a print job entity, the method comprising:  
5            establishing a repository of attributes and status information associated with  
6            each print job that passes through a printer system; and  
7            providing an interface to a plurality of components to allow access to the  
8            attributes and status information in the repository by the plurality of components.